Subsea Tree Valve Actuator Permanent Reinstatement Systems

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Introduction

- Problem Overview
- Temporary Fix
- Neptune Permanent Tree Valve Actuator Reinstatement Systems
  - Diver Deployed Reinstatement System
  - ROV Deployed Reinstatement System
  - System
Problem Overview

- Seal Failure on Subsea Tree valve actuators (PWV, AMV)
- Excessive and unsustainable hydraulic fluid leakage on actuator stem seals

Current Temporary Fix

- LAOT’s (Linear Axial Override Tools) installed to hold the tree valve in permanently open position
- Not designed for extended subsea operation
- Requires costly inspection and integrity tests
- LAOT’s remove functionality from the platform to open and close the valves
- Unable to respond effectively to an emergency shutdown
- Costly ROV intervention required for such events
- Next alternative is to change out the Tree
Permanent Tree Valve Actuator Reinstatement System

- Designed for permanent installation and full reinstatement of leaking actuator valve functionality
- 20 year design life
- Multiple redundancy sealing
- Advanced surface coatings
- Contamination tolerant
- Designed for optimum reliability in line with API 17N
- Restores full valve functionality to the platform
- Valve controlled by same SCM and software as the host (failed) actuator
- Closure time of the valves are designed to meet ESD criteria
- Qualified in accordance with API 17D and new draft of 17Q
- Diver deployable
Permanent Tree Valve Actuator Reinstatement System

- A modified bridging plate reroutes the hydraulic supply pressure from the SCM to the Permanent Tree Valve Actuator Reinstatement Tool (PCOL), via the auxiliary skid

Auxiliary skid provides:
- Direct SCM control interface
- Workover control functionality by intervention vessel/rig
- Workover control functionality by the platform
- ROV Intervention functionality
- Hydraulic compensation systems
Permanent Tree Valve Actuator Reinstatement System

- 3 systems successfully installed and operating
- TRL 7 (Technology Readiness Level)
  - Field proven
  - Fully operational systems
- Costly Tree change out successfully avoided
Permanent Tree Valve Actuator Reinstatement System

- ROV deployable version of tree valve actuator reinstatement system (ROV-PLAOT) designed
- 10 000 ft/3005m operating depth
- TDU (Tool Docking Unit) deployable. Designed to be installed in high current regions
- Primary lock and secondary lock, TDU actuated
- Two thrust variants developed (530kN and 175kN)
- Same high level of multiple redundancy as the diver deployable version
- Engineered and will be qualified in line with API17D, API17N, draft API17Q
Permanent Tree Valve Actuator Reinstatement System

- Auxiliary skid designed for deployment and control support of up to two ROV-PLAOT systems
- 10000 ft/3005 m maximum operating depth
- Identical functionality as the diver deployable version
  - Direct SCM control interface
  - Workover control functionality by intervention vessel/rig
  - Workover control functionality by the platform
  - ROV Intervention functionality
  - Hydraulic compensation systems for two reinstatement systems
Key Messages

- Diver deployed reinstatement system fully qualified to relevant standards. 20 year design life, multiple redundancy, API17D, API17N, draft API17Q.
- Fully operational diver deployed permanent tree valve actuator reinstatement system.
  - TRL level 7
- Three subsea Tree installations successfully reinstated to full permanent functionality.
  - Costly inspection and intervention avoided.
  - Potential of a costly Tree change out avoided.
- System can be used for various types of tree valve with minor design changes to locking profile.
- ROV deployable version successfully developed and engineered.
  - 10,000ft/3005m depth rated, ROV TDU deployed.
  - Two thrust variants for different actuator sizes.
Thank you, Any Questions?